

2002



# Tap into Quality

DURHAM



1869  
CITY OF MEDICINE



*Floating dock at Lake Michie recreation area, Aug. 2002.*

## What a Year!

2002 began with a 100-year drought event and ended with one of the worst ice storms in recent history. This year's edition of **Tap into Quality** details how Environmental Resources staff responded to unprecedented challenges to deliver an average of 27.8 million gallons of drinking water per day to over 180,000 customers.

Although this report is required by the Federal Safe Drinking Water Act (1996 Amendments), the City of Durham welcomes the opportunity to update you on the quality of the water you depend on every day. You will be happy to know that the water supplied by Durham's system (PWS ID # NC 0332010) continues to meet all water quality standards set by state and federal agencies. The table on the following pages summarizes the results of analysis of the City's drinking water. Each year Environmental Resources laboratory staff conducts analysis on more than 100 different constituents and reports the concentrations detected. Of those detected, all were well below the levels allowed by both the state and EPA.

### THE DRY FACTS: THE DROUGHT OF THE CENTURY

During the last ninety days of 2001, Durham received 1.76 total inches of rainfall - less than 20% of its usual precipitation! Review of historical records showed that the previous driest year occurred in 1933 when between October and December, Durham received only 2.93 inches of rain. That means that this recent event was drier than the Dust Bowl years.

Weather conditions worsened as the dry spell continued until mid-October of 2002, leading to the worst drought event in Durham and North Carolina history.

Both of Durham's primary water sources, Lake Michie and Little River, reached all time low levels. The Piedmont of North Carolina was actually the epicenter of the drought on the east coast of the United States.

### HIGHLIGHTS OF THE DROUGHT

- ☔ 2002 was the first year since records have been kept that Durham did not begin the water year (starts April 1) with two full lakes.
- ☔ There were no April Showers! Less than one-half inch of rain fell in Durham's watersheds during April.
- ☔ When voluntary water restrictions were imposed on June 13th, water usage jumped up between 5 and 10%.
- ☔ With mandatory restrictions in place (effective June 26th), water usage dropped by 25% as compared to June usage before restrictions were imposed.
- ☔ To augment supplies, Durham obtained approximately 3 MGD of water per day from the Town of Cary over a 45-day period in July, August and September.
- ☔ Rains over Labor Day weekend extended the water supply by about 30 days, but the extreme dry conditions continued until October 10. Approximately 7 inches of rain fell in 48 hours, filling the two supply lakes and leading to the City's lifting of water restrictions.
- ☔ By December 31, 2002, Durham had received our annual average rainfall of 46 inches per year, but 49% of the rain fell in the last three months of the year!
- ☔ Over the entire twelve-month period, water demand averaged 27.87 million gallons per day (MGD). This reflects a 14% decrease from 2001, when daily demand averaged 32.4 MGD!



**RAIN BARRELS** were offered for sale at several Waste Less Fests. These 65-gallon capacity barrels, made out of recycled plastic, were much in demand throughout the area.





## CONQUERING THE COLD FURY: THE 2002 ICE STORM

In December 2002, severe winter conditions created yet another unprecedented challenge for Environmental Resources staff and operations. The record-setting weather event layered Durham streets, trees, power lines, homes and businesses with an inch of ice. Freezing temperatures, widespread power outages, hazardous road conditions and other safety concerns led City officials to issue a dusk to dawn curfew and a state of emergency declaration. The loss of power and mobility stretched

Environmental Resources personnel and equipment resources. At various times during the ice storm, all of the City's water treatment and wastewater treatment facilities were operating on stand-by power. Even though the Brown Water Treatment Plant lost complete electrical power for 24 hours during the ice storm, water pressure was maintained and service to citizens was uninterrupted. The Williams Water Treatment Plant met the total demand for service until Brown Plant operations were restored. Fortunately, there were no major fires or water line breaks that could have led to even more serious challenges or disruption of water service to Durham water customers.

## COMMUNITY OUTREACH & EDUCATION

Throughout the year, customers can get one-on-one advice on water conservation and water quality at events such as CenterFest, Earth Day and Waste Less Fests. The latter events are held seven times a year in collaboration with the Solid Waste Department. At these events, customers may dispose of mixed paper in an environmentally responsible manner, purchase a compost bin or exchange their water-wasting showerhead for a new, water-efficient one. Check the City's website for dates and locations.

Conservation staff members conducted over 70 presentations to Durham area school children in 2002. At Science Days and Science Spectaculars, students learned about the importance of having an adequate supply of safe drinking water and how to keep it that way. Lessons learned were expressed in their entries in the annual poster contest. Winning entries in the 2002 Water Conservation Poster Contest were:

### Grades K – 2, theme: "Don't be a Drip – Save Water"

1st place, Maya Sugg, EK Powe Elementary  
2nd place, Simone Simpson and Secolia Bishop, Eno Valley Elementary  
3rd place, Deborah Wearing and Bryania Borland, Eno Valley Elementary



*Vicki Westbrook, Conservation Coordinator for the City of Durham Environmental Resources, discusses water conservation with students from Duke School for Children.*

### Grades 3 – 5, theme: "Stick Up for Conservation"

1st place, Jayvon Johnson, CC Spaulding Elementary  
2nd place, Michelle Collins, CC Spaulding Elementary  
3rd place, Jawan Wilson, YE Smith Elementary

### Grades 6 – 8, theme: "Water Reuse – the Ultimate Water Cycle"

1st place, Ping Niou, Duke Middle School  
2nd place, Melanie Watkins, Duke Middle School  
3rd place, Tess Guzé, Duke Middle School

# Durham's Water Sources

The sources of drinking water - both tap and bottled - include rivers, lakes, streams, ponds, reservoirs, springs and wells. Durham is fortunate to have two high quality sources of raw (untreated) water - Lake Michie, built in 1926, and the Little River Reservoir and Dam which was completed in 1988. These two lakes, located in the northern portion of Durham County, supply the City with 37 MGD. In addition to having two water supplies, Durham also has two water treatment plants, the Williams Water Treatment Plant and the Brown Water Treatment Plant, which have a combined treatment capacity of 52 MGD. Water can be transferred from the two supply lakes to the two treatment plants by gravity flow, hydro-power or electric power. During the spring of 2002, Durham supplemented the water supply with approximately 4 million gallons per day from the Eno River when stream flows allowed. The city plans to continue to use the Eno as a supplemental supply during dry conditions. Also during 2002, the City of Durham received an allocation of 10 million gallons per day from Jordan Lake. Currently, our access to this allocated water is through the Town of Cary's water system. Eventual plans call for building a raw water intake at Jordan Lake. During the height of the drought, Durham purchased approximately 3 million gallons of water per day from the Town of Cary to help offset demands on the water treatment system. Negotiations to turn the Hanson Quarry, known to most people as Teer Quarry, over to the City were finalized in the summer of 2002. When environmental studies are complete at the site, the water in the quarry can be used as supplemental storage and supply.

## HOW IS DURHAM'S WATER TREATED?

Both the Williams Water Treatment Plant (built in 1917) and the Brown Water Treatment Plant (built in 1977) operate using optimized conventional water treatment processes. At the water treatment facilities, raw water is mixed with lime to adjust the pH and alum to coagulate particles. After mixing, the water flows into settling basins where the particles clump together (coagulation) and become heavy and settle to the bottom of the basins (flocculation). The clearer water flows through filters to remove the remaining particles prior to final disinfection with chloramines. Fluoride is then added prior to distribution to our customers.

## HOW DOES WATER TRAVEL?

As water travels over the surface of the land or through the ground, minerals and other materials are dissolved naturally. Water can also pick up substances that are the result of animal or human activity. Source water may contain microbial contaminants such as viruses and bacteria; inorganic contaminants such as salts and metals; pesticides and herbicides from agriculture or urban run-off; organic chemicals from industrial processes or run-off; and radioactive contaminants which can be naturally occurring.

## WHAT CAN YOU EXPECT OF DRINKING WATER?

In order to ensure that tap water is safe to drink, the EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. The Food and Drug Administration establishes regulations for contaminants in bottled water that must provide the same protection for public



health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791).

## COMMUNITY PARTICIPATION

How can you be involved in decisions regarding Durham's water system or other City issues? Citizens are welcome to attend regularly scheduled meetings of Durham's City Council. Council meetings are the first and third Monday of each month at 7:00 p.m. City Council members also have regular work sessions to prepare for Council meetings. These sessions occur on Thursdays - two weeks prior to each regular business (Council) meeting. Work sessions are held at 1:00 p.m. in the Council's Committee Room on the second floor of City Hall. Council meetings are held at City Hall in the Council Chambers on the first floor. Check the City's website to confirm meetings @ [www.ci.durham.nc.us](http://www.ci.durham.nc.us). City Hall is located in downtown Durham at 101 City Hall Plaza.

Like Durham, the Town of Cary must analyze its drinking water for hundreds of constituents. During 2002, Cary drinking water also met all water quality standards set by state and federal agencies. For more information on the Town of Cary's drinking water call (919) 362-5502 or visit their website at [www.townofcary.org](http://www.townofcary.org).



## QUESTIONS REGARDING THE INFORMATION IN THIS REPORT

should be directed to Environmental Resources Department staff at the Brown Water Treatment Plant at 560-4362. For information on water conservation or to arrange a tour of facilities, call 560-4381. Call 560-4411 for all billing questions. For additional information about City operations and services, contact the City's Office of Public Affairs at 560-4123.

**EN ESPAÑOL** Este folleto tiene informacion importante acerca de la calidad del agua que provee la Ciudad de Durham. Si necesita mayor informacion acerca del contenido de este folleto el personal del Centro Hispano, 201 W. Main Street, Suite 100, tele fono, (919) 687-4635 puede ayudarlo.

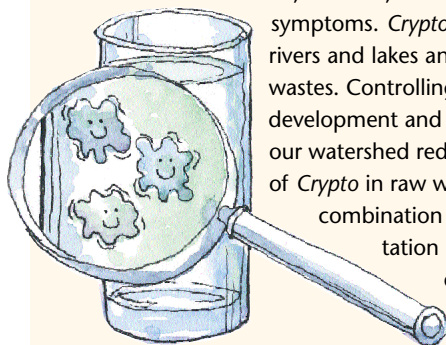


## SPECIAL CONCERNS

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers.

### CRYPTOSPORIDIUM:

This microscopic organism is a relatively new concern for water providers. When ingested, *Cryptosporidium* can cause



fever, diarrhea, and other gastrointestinal symptoms. *Crypto* occurs naturally in rivers and lakes and comes from animal wastes. Controlling and minimizing development and animal activities in our watershed reduces the occurrence of *Crypto* in raw water. The treatment combination of filtration, sedimentation and disinfection effectively eliminates *Crypto* from the drinking water.

As part of the Information Collection Rule, Durham has monitored both supply lakes on a monthly basis since July of 1997. *Crypto* has never been detected in Durham's treated drinking water.

EPA/CDC guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial organisms are available from the Safe Drinking Water Hotline (800-426-4791).

## How Do We Measure Up?

**YOUR OPINION COUNTS.** Please circle your choice and feel free to write specific comments for each question listed below. To thank customers for their participation, all surveys returned by July 30 will be entered in a drawing for two tickets to a Durham Bulls baseball game.

- 1) Is the information in this water quality report clear and informative? YES NO
- 2) Do you have concerns about the quality of your drinking water? YES NO
- 3) Have you had any problems with the taste, odor or clarity of your drinking water? YES NO
  - A) Has the issue been resolved to your satisfaction? YES NO
  - B) Did you have difficulty reporting problems with your water quality? YES NO
- 4) Have you had to call Customer Service about any billing problem? YES NO
  - A) If yes, is this a recurring problem? YES NO
  - B) Was the problem resolved to your satisfaction? YES NO
- 5) Have you had any problems with unplanned service interruptions or with adequate pressure? YES NO
- 6) Do you know how to report water line breaks or sewer back-ups? YES NO
- 7) Please rate City water and sewer utility staff on a scale of 1 (least satisfactory) to 5 (most satisfactory) for the following criteria.  
Polite\_\_\_\_ Prompt\_\_\_\_ Knowledgeable\_\_\_\_
- 8) What additional information would you like to see included in this report? \_\_\_\_\_
- 9) Please rate the quality of water and sewer service on a scale of 1 (poor) to 5 (excellent) \_\_\_\_\_
- 10) Please rate the value of water and sewer services on a scale of 1 (overpriced) to 5 (affordable) \_\_\_\_\_
- 11) Comments/Suggestions: \_\_\_\_\_

Name: \_\_\_\_\_

Day Phone: ( \_\_\_\_ ) \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Please complete and return to:

City of Durham Environmental Resources  
101 City Hall Plaza  
Durham, NC 27701

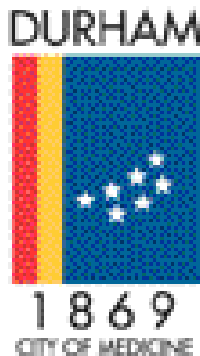
*Thank you for taking the time to complete this survey.*

# City Kicks-off “Water–Use It Wisely!” Campaign

Environmental Resources Conservation staff began working with other water providers throughout the state to launch a nationally recognized water conservation education campaign. The catch phrase “There are a number of ways to save water...and they all start with you!” and the colorful logo will be popping up in ads, brochures, on the website and other communication tools in the future. Lessons learned during last year’s record-breaking drought will be reinforced by the campaign. As a reminder, here are some key water conserving tips:



- ☂ Make sure you know where your master shut-off valve is located. This could save gallons of water and damage to your home if a pipe were to burst.
- ☂ Check your sprinklers frequently and adjust sprinklers so that only your lawn is watered and not the house, sidewalk or street.
- ☂ Use a hose nozzle and turn off the water while you wash your car and save more than 100 gallons.
- ☂ Turn off the water while you shave and you can save more than 100 gallons a week.
- ☂ Run your washing machine and dishwasher only when they are full and you could save 1000 gallons a month.
- ☂ Adjust your lawn mower to a higher setting. Longer grass shades root systems and holds soil moisture better than a closely clipped lawn.
- ☂ Put food coloring in your toilet tank. If it seeps in into the toilet bowl, you have a leak. It’s easy to fix, and you can save more than 600 gallons a month.
- ☂ Time your shower to keep it under 5 minutes. You’ll save up to 1000 gallon a month.
- ☂ Keep a pitcher or jug of water in the refrigerator instead of running the tap for cold drinks, so that every drop goes down YOU and not the drain.



## 2002 WATER QUALITY SUMMARY

| Substance & Unit of Measurement                  | Max. Level Detected and Range        | Max. Level Allowed MCL | Ideal Goal (MCLG) | Potential Source(s) of Substance   | Reason(s) for Regulating Substance   |
|--|--------------------------------------|------------------------|-------------------|--|--|
| REGULATED AT THE TREATMENT PLANTS                |                                      |                        |                   |  |  |
| <b>Barium</b><br>mg/L                            | 0.029<br>( $< 0.025 - 0.029$ )       | 2.0                    | 2.0               | Discharge of drilling waste; discharge from metal refineries; Erosion of natural deposits                    | Some people who drink water containing barium in excess of the MCL over many years could experience an increase in their blood pressure.   |
| <b>Fluoride</b><br>mg/L                          | 1.04<br>( $< 0.25 - 1.04$ )          | 4.0                    | 4.0               | Naturally occurring mineral; also added to promote dental health   | Some people who drink water containing fluoride in excess of the MCL over many years may get bone disease. Children may get mottled teeth.   |
| <b>Nitrate</b><br>mg/L (as Nitrogen)             | 0.50<br>( $< 0.10 - 0.50$ )          | 10.0                   | 10.0              | Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits                  | Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome.  |
| <b>Turbidity</b><br>NTU                          | 0.15<br>( $0.10 - 0.15$ )            | TT                     | N/A               | Soil runoff  | Turbidity has no health effect; however, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms.  |
| <b>Alpha emitters</b><br>pCi/L*                  | 0.54<br>no range                     | 15                     | 0                 | Emission of alpha radiation as a result of the erosion of natural deposits                                   | Some people who drink water with alpha emitters in excess of the MCL over many years may have an increased risk of cancer.   |
| <b>Beta/photon emitters</b><br>pCi/L*            | 2.80<br>no range                     | 50**                   | 0                 | Emission of photons and beta radiation as a result of the decay of natural and man-made deposits             | Some people who drink water with beta/photon emitters in excess of the MCL over many years may have an increased risk of cancer.   |
| REGULATED AT THE CUSTOMER'S TAP                  |                                      |                        |                   |  |  |
| <b>Copper</b><br>mg/L ***                        | 0.10<br>(90th percentile)            | AL=1.3                 | 1.3               | Corrosion of household plumbing systems<br>None of the targeted 103 sampling sites exceeded the Action Level | Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Long term exposure can cause liver or kidney damage.         |
| <b>Lead</b><br>µg/L ***                          | ND < 5<br>(90th percentile)          | AL=15                  | 0                 | Corrosion of household plumbing systems<br>2 out of 103 targeted sampling sites exceeded the Action Level    | Infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development. Adults who drink this water over many years could develop kidney problems or high blood pressure.            |
| REGULATED IN THE DISTRIBUTION SYSTEM             |                                      |                        |                   |  |  |
| <b>Chloramines</b><br>mg/L (as Cl <sub>2</sub> ) | 2.9 RAA<br>Running Annual Average    | MRDL<br>4.0            | MRDLG<br>4.0      | Water additive to control microbes   | Some people who use water containing chloramines well in excess of the MRDL may experience irritating effects to their eyes and nose. Some people who drink water containing chloramines well in excess of the MRDL may experience stomach discomfort or anemia. |
| <b>Total Coliform Bacteria</b><br>(as a percent) | 2%<br>positive                       | < 5%<br>positive       | 0<br>positive     | Human and animal fecal waste; indigenous sources such as vegetation; bacterial regrowth                      | Coliforms are used as an indicator that other, potentially-harmful bacteria may be present.  |
| <b>Five Haloacetic Acids</b> (SHAA)<br>µg/L      | 46.5-System average<br>(32.0 - 67.0) | 60                     | 0                 | Human and animal fecal waste; indigenous sources such as vegetation; bacterial regrowth                      | Some people who drink water containing HAAs in excess of the MCL over many years may have an increased risk of cancer.   |
| <b>Total Trihalomethanes</b> (TTHM)<br>µg/L      | 76.7-System average<br>(28 - 145)    | 80                     | 0                 | By-product of drinking water disinfection  | Some people who drink water with TTHMs in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous systems, and may have an increased risk of cancer.   |

| Substance & Unit of Measurement   | Max. Level Detected and Range  | Max. Level Allowed MCL | Ideal Goal (MCLG) | Potential Source(s) of Substance              | Reason(s) for Regulating Substance   |
|---|--|------------------------|-------------------|---|--|
| <b>UNREGULATED SUBSTANCES</b>   |  |                        |                   |   |  |
| <b>Chlorodibromomethane</b><br>µg/L   | 2.0<br>(< 10 - 2.0)  | NR                     | NR                | Component of TTHMs                            | <p>NOTE:</p> <p>Some people who drink water with TTHMs in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous systems, and may have an increased risk of cancer.</p>   |
| <b>Chloroform</b><br>µg/L   | 131<br>(23 - 131)  | NR                     | NR                | Component of TTHMs                            |  |
| <b>Bromodichloromethane</b><br>µg/L   | 17.0<br>(5 - 17)   | NR                     | NR                | Component of TTHMs                            |  |
| <b>Monochloro-acetic Acid</b><br>µg/L   | 23.6<br>(<2 - 23.6)  | N/A                    | N/A               | Component of SHAAs                            | <p>NOTE:</p> <p>Some people who drink water containing HAAs in excess of the MCL over many years may have an increased risk of cancer.</p>   |
| <b>Dichloro-acetic Acid</b><br>µg/L   | 62.0<br>(25 - 62)  | NR                     | N/A               | Component of SHAAs                            |  |
| <b>Trichloro-acetic Acid</b><br>µg/L  | 4.0<br>(2.0 - 4.0)   | NR                     | N/A               | Component of SHAAs                            |  |
| <b>Monobromo-acetic Acid</b><br>µg/L  | 4.0<br>(<1.0 - 4.0)  | NR                     | N/A               | Component of SHAAs                            |  |
| <b>Dibromo-acetic Acid</b><br>µg/L  | 0.4<br>(0.2 - 0.4)   | NR                     | N/A               | Component of SHAAs                            |  |
| <b>Sodium</b><br>mg/L   | 25.8<br>(10.2 - 25.8)  | NR                     | 20<br>[Proposed]  | Naturally occurring element in soil and water | Sodium is an essential nutrient, however, consuming high levels of sodium can contribute to high blood pressure.   |
| <b>Sulfate</b><br>mg/L  | 32<br>(21 - 32)  | NR                     | 500<br>[Proposed] | Naturally occurring mineral in soil           | Sulfate may have a laxative effect for some people who drink water containing high levels of sulfate.  |
| <b>Total Organic Carbon (TOC)</b><br>mg/l<br>Results show the range of TOC in both source and treated water. Durham's processes remove more the required 50%.   | Source<br>10.4 (4.8 - 10.4)<br>Treated<br>4.1 (2.7 - 4.1)<br>Average removal 51% | NR                     | TT<br>50% removal | Naturally present in the environment          | Total organic carbon (TOC) has no health effect; however, TOC provides a medium for the formation of disinfection byproducts. These byproducts include trihalomethanes (THMs) and haloacetic acids (HAAs). Drinking water containing these byproducts in excess of the MCL may lead to adverse health effects, liver or kidney problems, or nervous system effects, and may lead to an increased risk of cancer. |
| <p>*Samples were collected and analyzed July 2000.    **EPA considers 50 pCi/L to be the level of concern for beta particles.    *** Sampling and analysis conducted every three years. Sampling conducted in September 2001.</p> |  |                        |                   |   |  |



### ▲ PHYSICAL AND MINERAL CHARACTERISTICS

| SUBSTANCE, UNIT OF MEASUREMENT       | ANNUAL AVERAGE |
|--------------------------------------|----------------|
| pH, standard units - range           | 6.7 – 8.1      |
| Alkalinity, mg/L                     | 27             |
| Aluminum, mg/L                       | < 0.03         |
| Calcium, mg/L                        | 8.8            |
| Chloride, mg/L                       | 14.2           |
| Conductivity, micromhos/cm           | 178            |
| Hardness - Calculated, mg/L          | 32             |
| Hardness - EDTA, mg/L                | 32             |
| Orthophosphate, mg/L (as phosphorus) | 0.31           |
| Potassium, mg/L                      | 2.3            |
| Total Solids, mg/L                   | 105            |
| Zinc, mg/L                           | 0.33           |

### ▲ KEY TO ABBREVIATIONS IN TABLE

|       |   |
|-------|---|
| mg/l  | milligrams per liter, or parts per million  |
| MCL   | Maximum Contaminant Level: the highest level of a contaminant that is allowed in drinking water.  |
| MCLG  | Maximum Contaminant Level Goal; the level of a contaminant in drinking water below which there is no known or expected risk to health.  |
| MRDL  | Maximum Residual Disinfectant Level; the highest level of a disinfectant allowed in drinking water.   |
| MRDLG | Maximum Residual Disinfectant Level Goal; the level of a drinking water disinfectant below which there is no known or expected risk to health.  |
| AL    | Action Level; the concentration of a contaminant that triggers treatment or other requirements that a water system must follow. Action Levels are reported at the 90th percentile for homes at greatest risk. |
| TT    | Treatment Technique; a required process intended to reduce the level of a contaminant in drinking water   |
| µg/l  | micrograms per liter, or parts per billion  |
| pCi/L | Picocuries per liter is a measure of the radioactivity in water.  |
| NTU   | Nephelometric Turbidity Units; measures the cloudiness in water   |

**ND = Not Detected**

**NR = Not Regulated**

**< = Less Than**

**N/A = Not Applicable**